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**A New Species of *Syntropis* from Baja California Sur, Mexico
with Notes on its Biology**
(Scorpionida: Vejovidae)

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In 1900 Kraepelin described a new genus and species of scorpion which he named *Syntropis macrura* based on a single specimen. This genus was of special interest because it was characterized by the presence of a single, unpaired inferior median keel on the metasoma, instead of the paired condition generally found in the family. Over the years this genus acquired more and more interest since its uniqueness within the family Vejovidae became better recognized and since it still remained known by only the type specimen.

During the summer of 1968 extensive field work in the Baja California peninsula of Mexico revealed much information about the genus *Syntropis*. Two parties, one led by Mont A. Cazier, the other by myself, together collected several dozen *Syntropis macrura* and over 1,000 specimens of a new species of *Syntropis*, here described and named *Syntropis longiunguis*.



FIGS. 1 and 2. *Syntropis longiunguis* Williams, holotype male. FIG. 1. Dorsal view. FIG. 2. Ventral view.

***Syntropis longiunguis* Williams, new species**

(Figs. 1, 2)

DIAGNOSIS.—Moderate sized, light yellow species easily placed in genus *Syntropis* by single median keel on inferior surface of metasoma. Differs from *S. macrura* as follows: uniform light yellow in color (not rusty); fingers of pedipalp distinctly shorter and with subtle internal scalloping; palm swollen; telson not bulbous but strikingly elongate; pretarsal claws very elongate, outer claw of each pair distinctly longer; unguicular spine reduced; distal tarsomere densely hirsute and lacking definite row of short spines; inferior border of fixed cheliceral finger with several minute denticles.

HOLOTYPE MALE.—*Coloration*.—Carapace, mesosoma, metasoma and pedipalps of uniform pale yellow; walking legs and pectines similar but lighter; only contrasting

color markings are: eyes black, teeth of chelicerae and chela reddish-brown, aculeus dark reddish-brown, tips of pretarsal claws light reddish-brown. Most of cuticle lustrous.

Carapace.—Anterior margin straight and narrow, set with three pairs of erect reddish bristles. Lateral eyes three per group, these very tiny. Median eyes on raised ocular tubercle; one pair of stout bristles on ocular tubercle medial and posterior to median eyes; diad $\frac{1}{4}$ carapace width at that point, and completely on anterior half of carapace. Carapace surface with large granules; median groove narrow and shallow anterior to median eyes, continues over ocular tubercle, becomes deeper posteriorly, ends as relatively deep pit near posterior border of carapace. Carapace wide posteriorly and conspicuously narrows near anterior border.

Mesosoma.—All dorsal plates densely covered by large granules mostly located on posterior part of each tergite, median and anterior areas relatively smooth; subtle suggestion of obsolescent median keel on tergites 3 to 7; tergite 7 with two pairs of distinct lateral keels set with large dentate to serrate granules; lateral margin of segment 7 abruptly flattened horizontally and set with large dentate granules. Sternites relatively smooth, agranular and transparent; one pair of poorly developed lateral keels on last sternite, these smooth to crenulate. Stigma long and slit-like.

Metasoma.—All dorsal and dorsolateral keels complete and well developed except dorsals absent on segment V; keels deeply serrate on segments I to IV and each terminates posteriorly in enlarged spine; segment V with dorsolateral keels finely serrate over anterior half but gradually becomes obsolete on posterior half; dorsal keels gradually converge posteriorly on segments I to III. Lateral keels deeply dentate along length of segment I; keels represented as four granules along posterior $\frac{1}{4}$ of II and posterior $\frac{1}{5}$ of III; absent on IV; crenulate on anterior $\frac{1}{9}$ of segment V. Inferior lateral keels present and complete on all segments, irregularly crenulate on I to III, irregularly serrate on IV and V. Inferior median keel unpaired where present; keel absent on segments I and II, smooth to obsolete on III, smooth to crenulate on IV, irregularly serrate on V and not extending to posterior margin of segment. Inferior intercarinal space of segment V with about eight pairs of stout reddish hairs, surface very finely granular. Segment V with very conspicuous gradual, posterior taper in width.

Telson.—Entire vesicle long slender and lance-shaped, with no bulbous appearance; vesicle elongate, indistinguishable from aculeus except by beginning of reddish-brown pigmentation of aculeus. Ventral surface of vesicle with about 10 to 12 pairs of moderately long reddish hairs; entire surface of vesicle agranular, smooth, lustrous; no subaculear tubercle. Base of aculeus with lateral pair of finely barbed strips.

Pectines.—Long and thick; middle lamellae numerous, most subcircular, but proximally several become more columnar; fulcra subcircular to triangular; 31/30 pectinal teeth; teeth long; entire inferior surface of pectines (except teeth) densely covered with short light brown hairs, each fulcrum with 10 to 15 of these hairs.

Genital Operculum.—Completely divided longitudinally; large distinct genital papillae visible externally.

Sternum.—Distinctly pentagonal, length approximates width, with deep triangular pit posteriorly.

Chelicerae.—Inferior border of movable finger completely lacking denticles, border may appear subtly crenulate under high magnification, but essentially

smooth. Inferior border of fixed finger with row of three or four small unpigmented granules.

Pedipalps.—Hand swollen, palm keeled, fingers of moderate length. Superior and secondary superior keels set with rounded granules; inner marginal keel essentially smooth; inferior keels at base of movable finger with dentate granules. Carapace slightly shorter than movable finger but distinctly longer than fixed finger. Grasping edge of fingers armed with one long continuous row of sharp serrate denticles, each row subdivided by the occurrence of eight to nine distinctly larger and spaced denticles. Principle row of denticles flanked inwardly by eight to nine lateral denticles, no such denticles flank outer side of principal row. Fixed finger distinctly extends distally further than movable finger, each finger terminates in small, sharp, cone-shaped denticle. Both fingers with slight scalloping of their grasping edges; teeth not extending to proximal end of either finger and small open space remains in proximal end of chela when fingers closed.

Walking Legs.—Tarsomeres with abundant, long reddish hairs, most conspicuous on distal one. Pretarsal claws very elongate and not symmetrical in relation to length, outer claw always distinctly longer than inner claw (2.0 and 1.5 mm respectively on hind walking legs); unguicular spine reduced in size; unguicular lobe very elongate and densely set with long stout reddish hairs. Pedal spurs paired, elongate, and tipped with red pigment, but not serrate.

ALLOTYPE FEMALE.—Essentially as holotype in coloration and morphology with following exceptions: slightly smaller in total length; slightly wider in carapace width; chela slightly longer and with distinctly more elongate fixed finger; pectines smaller and with slightly fewer teeth (27/26 instead of 31/30); no genital papillae; genital operculum not completely divided longitudinally.

Standard Measurements.—Table 1.

Study of 690 paratopotypes (255 males, 325 females, 110 early instar nymphs) indicated little variation from the descriptions of the holotype and allotype. Males varied in total length from 14 to 60 millimeters while females varied from 14 to 66 millimeters. Adult males and females tended to have about equivalent body sizes and proportions, the females, however, had carapace slightly wider and longer, and with chela slightly more elongate. Pectine tooth count varied from 24 to 31 in females and from 28 to 35 in males. Many very young juveniles (probably second and third stage) were encountered in the samples and these were similar to adults except for their smaller body size and more tan appearance. Very little sexual dimorphism occurred. Adult and older subadult male instars had genital papillae distinct while females lacked these organs. Males had genital operculum more completely divided longitudinally and had larger pectines. Male pectines tended to have more teeth than female pectines, but counts often overlapped, adult male pectinal teeth were longer than those of the female.

The *holotype male*, allotype and 690 paratopotypes were collected on the SAND DUNES OF SAN ANGEL, 13 MILES WEST OF SAN IGNACIO, BAJA CALIFORNIA SUR, MEXICO, 27 June 1968 by S. C. Williams, M. A. Cazier

TABLE 1. Measurements (in millimeters) of *Syntropis longiunguis* Williams, new species, holotype and allotype.

	Holotype (male)	Allotype (female)
Total length	58.7	58.1
Carapace, length	7.2	7.8
width (at median eyes)	5.8	6.3
Mesosoma, length	13.0	13.0
Metasoma, length	28.1	27.3
segment I (length/width)	3.8/3.8	3.7/3.9
segment II (length/width)	4.4/3.7	4.3/3.8
segment III (length/width)	4.5/3.6	4.5/3.7
segment IV (length/width)	5.7/3.5	5.6/3.5
segment V (length/width)	9.7/3.0	9.2/3.0
Telson, length	10.4	10.0
Vesicle (length/width)	7.4/1.8	6.5/2.0
depth	1.6	1.8
Aculeus, length	3.0	3.5
Pedipalp		
Humerus (length/width)	5.6/2.0	5.7/2.1
Brachium (length/width)	5.9/2.8	6.3/2.8
Chela (length/width)	11.3/3.0	11.8/2.9
depth	3.8	4.0
movable finger, length	7.5	7.7
fixed finger, length	5.8	6.6
Pectines		
teeth (left/right)	31/30	27/26

and party. The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is named "longiunguis" because of its highly modified pretarsus in which the ungues are conspicuously elongate and the ungular spine is greatly reduced.

In addition to the holotype, allotype and 690 paratopotypes, an additional 793 paratypes were available for study. All specimens were collected in the following three localities in Baja California Sur, Mexico: 3 miles south of Rancho Tablon, elevation 1,500 feet, 23 June 1968 (S. C. Williams, M. A. Cazier and party), 29 males, 40 females; 5 miles west of San Angel, 28 June 1968 (S. C. Williams, M. A. Cazier and party), 69 males, 92 females, 37 young juveniles; approximately 5 miles north of La Laguna on east shore of Laguna de San Ignacio, 29 June 1968 (S. C. Williams, M. A. Cazier and party), 229 males, 216 females, 81 young juveniles.

COMMENT.—This species was found along the west coast of the Baja California peninsula from Rancho Tablon to near La Laguna. In this area it showed definite preference for habitats characterized by unpacked dune type soils. These habitats, appeared to be secondarily created by sand transported in by the prevailing winds. Throughout this area this sand takes the form of totally unstabilized and moving sand dunes. These dunes are large and very extensive in places such as San Angel but may be very small and relatively isolated in areas like Rancho Tablon. In the habitats of occurrence this species was conspicuously the numerically dominant scorpion. It had a nervous and responsive temperament, was intolerant to other scorpions of the same or different species and showed very aggressive behavior toward any local disturbance in the nearby sand.

The morphological modifications of this species for sand dwelling are striking. The pretarsal claws are extremely elongate while the unguicular spine is very reduced in size. The entire surface of the last tarsomere is densely clothed in long reddish hairs which permit rapid locomotion on loose sand without lack of traction. This species is even capable of traveling up the steep leeward side of large sand dunes at a fast speed. The streamlining of the metasoma and telson is perhaps an adaptation for escaping from being buried in the loose sand.

At night the surface of the sand dunes were abundantly covered with individuals of this species. The population was densest on sloping regions of the dunes rather than on the crests or basins. The scorpions came out on the sand surface at dusk and sat perfectly still. A moving specimen was a rare observation. When disturbed on the side of a dune an individual would escape by gliding rapidly over the sand and coming to rest in a lower location about 10 to 15 feet away. They always escaped in a downward direction.

Most of the individuals appeared to be sexually mature, and males approximated females in number. Very young juvenile instars were also abundant. These were probably second and third instar nymphs. Intermediate aged subadults were rare on the surface of the dune. Dissection indicated that the adult females had already given birth to their young for the season. The great similarity of the reproductive systems of these dissected females indicated that time of birth must be synchronized to some extent within the population and that probably only a single litter is produced by a female during the year.

Based on the single inferior median keel of the metasoma, *Syntropis macrura* would be the closest known relative of this species. However, these two species of *Syntropis* do not appear to be closely related, and

even appear superficially very unrelated. In secondary morphological adaptation, ecology and behavior, *S. longiunguis* appears more like *Vejevovis mesaensis* (Stahnke) than any other North American scorpion. These two species should, therefore, be considered as ecological counterparts, *S. longiunguis* occurring in dune communities of the Viscaïno desert, *V. mesaensis* occurring in dune communities of the Sonoran and Colorado deserts. *Syntropis macrura* on the other hand appears more like *Vejevovis minckleyi* Williams in secondary morphological adaptation, ecology and behavior, *V. minckleyi* occurring in talus deposits and along rocky cliffs in Coahuila while *S. macrura* lives in similar habitats in the Sierra de la Giganta.

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**A New Species of Crane Fly Associated with the Plant Genus
Lopezia in Mexico**
(Diptera: Tipulidae)

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During the course of his studies on the pollination of plants of the onagraceous genus *Lopezia* in Mexico, Dr. Dennis E. Breedlove collected about a dozen species of Tipulidae of which one proved to represent a new species. In order to make the name available for his use the fly is described herewith. The type of the novelty, as well as the other crane flies collected, are preserved in the California Academy of Sciences. I am indebted to Dr. Paul H. Arnaud and Dr. Breedlove for the privilege of examining this interesting material.

***Tipula* (*Trichotipula*) *breedlovei* Alexander, new species**

Mesonotal praescutum with four nearly confluent grayish brown stripes, posterior sclerites of notum variegated brown and yellow, pleura chiefly light gray; wings light brown, stigma and costal border slightly darker; outer wing cells with strong